

THREE PROPOSED NEW SPECIES OF LAMPREY ON THE PACIFIC

COAST OF CANADA

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EXTENDED ABSTRACT ONLY- DO NOT CITE

We report three proposed new species of lamprey in British Columbia, Canada. Two undescribed and possibly rare species are from the Nass River. The third undescribed species is from Skidegate Lake located in the Queen Charlotte Islands. Standard characters used in lamprey systematics as well as a new character are used to distinguish the new forms. We also propose tentative names, *Lampetra nisga*, *Lampetra lisims* and the Skidegate Lake Lamprey, for these three species.

L. nisga was found in fresh water and the prominence of the teeth and the size are indications that it is parasitic. *L. nisga* is distinguished from *Lampetra tridentata* by its dentition, velar tentacles, body properties and a new character, the morphology of the gill pore papilla. *L. nisga* is distinguished from *Lampetra ayresi* by having a smaller eye, a shorter prebranchial region, a shorter preorbital length, a larger disc and a distinct pattern of gill pore papilla. *L. nisga* also has fewer cusps on the longitudinal lingual lamina. We have only

one adult specimen of *L. nisga*, a maturing female that has no evidence of secondary sexual characters (upturned tail, shortened caudal area with a swollen tissue around the cloaca and an increased height of caudal and dorsal fins). This suggests that the specimen was migrating up the river to spawn in the following year. The well-developed, but empty gut, the sharp and well-developed teeth, the large size of 24.7 cm and the large number of eggs in the gonad relative to *Lampetra richardsoni* indicate that this species has a parasitic life history. The size is similar to smaller adult *L. ayresi*. Thus it is probable that the lamprey fed only during the late spring and summer, but it is unknown if it feeds in fresh water or the ocean.

The new character is the number and morphology of the gill pore papilla. There are a series of papilla on the posterior margin of each branchiopore. There also may be a single, larger papilla deeper on the posterior wall of the pore. Preliminary studies of a number of species indicate that the number and morphology of the gill-pore papilla are distinctive at both a species and genus level. The number, morphology and the placement of these papilla appear to be particularly useful when comparing populations of the nonparasitic form of paired species.

The second proposed new species, also from the Nass River, *L. lisims*, was represented by 6 specimens and is a non-parasitic species that differs from the only other non-parasitic species in British Columbia *L. richardsoni*, and from a single but smaller specimen in the collection. There is some variation in the appearance of the 6 larger specimens but collectively and individually they were distinct from the one smaller specimen in the sample, and from type specimens of *L. richardsoni*. We grouped all 6 as representing one, new species. The teeth in all 6 were obsolete; some were so degenerate that no cusps were visible, indicating that the specimens were non-parasitic. The digestive tract was thin in all specimens, another indication that the lamprey were non-parasitic. All specimens had spawned or were spawning when captured. *L. lisims* was distinguished from the single smaller specimen by having a larger disc, a longer preorbital length, a larger branchial, and possibly a larger prebranchial length. The velar tentacles of *L. lisims* appeared reduced in number (range of 2-3) compared to the small specimen (4). However, since both the number of tentacles and number of specimens were small, the velar tentacle number would not be a distinguishing character. The large and small forms had a posterior margin of the branchiopore that formed a lip or ridge with a central notch that gives the lip a bilobed appearance. Each lobe had two rows of papilla. The papilla in the smaller form were smaller than the larger specimens while the

deeper single papilla was larger. As this is a new character, it has not been possible to compare our measurements with the holotype and paratypes of *L. richardsoni* as no published descriptions exist.

The proposed third new species was represented by 2 specimens. The fish collection at the University of British Columbia contained two lamprey specimens collected from Skidegate Lake on the Queen Charlotte Islands in British Columbia in 1963 and identified as *L. ayresi*. Each specimen was a mature male that was in spawning condition. These mature lamprey had prominent teeth that were not obsolete as is characteristic of maturing non-parasitic lamprey. Thus, it appeared that these two lamprey were parasitic, but their relatively small size (176 mm, 178 mm) indicated that if they were parasitic, the duration of the feeding period was quite short. Another possibility was that they were non-parasitic, but different from *L. richardsoni* because they retained prominent teeth at maturity.

Extensive measurements of these two specimens were made in 1984. Unfortunately the specimens are no longer in the fish collection at the University of British Columbia. However, recent surveys in November 2001 were able to capture ammocoetes that may be the Skidegate Lake lamprey as they are the largest recorded in British Columbia, growing to lengths of 20 to 24 cm. The Skidegate Lake lamprey is not *L. ayresi* because the eye to total length ratio is smaller than the bottom of the range reported for the type specimens of *L. ayresi*. The prebranchial length to total length ratio is also smaller than the lowest value reported for *L. ayresi*. The two specimens have 5 and 6 velar tentacles which is similar to the number characteristics of *L. ayresi* and *L. richardsoni* but each velar apparatus had a “feathery” appearance as projections were apparent along the longitudinal axis of some tentacles. The Skidegate Lake lamprey is similar to *L. richardsoni*, but has a smaller prebranchial length, that when averaged for the two specimens, is less than the lowest length for *L. richardsoni*. It is important to note that a major reason the *L. richardsoni* was originally described as a distinct species was that the branchial region was longer than the branchial region of *Lampetra planeri* by 12%. Thus the smaller prebranchial region of the Skidegate Lake lamprey is a significant difference of taxonomic importance at the species level. The Skidegate Lake Lamprey also exists in an area that may have not been covered with ice during the last glaciation.

